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BULLETIN  
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Notes on *Trichomanes*—I. The identity of *Trichomanes*  
*pyxidiferum* L.

MARGARET SLOSSON

(WITH PLATES 30 AND 31)

The genus *Trichomanes* as included by Linnaeus in his "Species Plantarum" contains eleven species of the genus as now understood, in addition to certain species now included in *Hymenophyllum* and *Davallia*. The first species mentioned is *Trichomanes membranaceum*. But Linnaeus had previously established the genus as a monotypic one based on Plumier's *pl.* 86.\* This plate represents *Trichomanes crispum*, which must thus be regarded as the type of *Trichomanes*.

Since Linnaeus's time many subdivisions of the genus have been made and some raised to generic rank. It is not proposed to enter into a discussion of the validity of these groupings in these "Notes." The genus *Trichomanes* is here referred to in its widest sense. Nor is it proposed to undertake a monograph of the genus or any of its subdivisions. To do so would be a somewhat tremendous undertaking, as those who have attempted to sort out even a few of the species will agree. The genus is in a chaotic state. The chief reason for this is the large number of descriptions of species that have been published without illustration. With plants of this nature, accurate figures of some sort accompanying specific descriptions are in many cases a necessity; it is often practically impossible to furnish a written description that will apply to one species and to one alone.

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\* Gen. Pl. 20. 1737; also Hort. Cliff. 476. 1737.

In this state of affairs all attempts to fix upon the oldest name for any species of the genus, excepting Linnaean species, must be temporarily given up. We have first to see if the current idea of the plant may not be erroneous, and if the plant can be definitely pinned to a given name. During the last three years I have been fortunate enough to obtain for examination, mostly through the kindness of European botanists, types of various species, and to have had for comparison with such adequate plates of published species as do exist, a large collection of tropical American plants, including the collections at the New York Botanical Garden, and many specimens from the United States National Museum at Washington which Mr. William R. Maxon has kindly allowed me the privilege of examining. In these "Notes" photographs of these types will be published, and old plates reproduced side by side with photographs of herbarium specimens when it appears that the identity of any species has been misunderstood and can be definitely fixed upon in this way. This should give part of a foundation for a future revision of the genus. Photographs, when sufficiently enlarged, do not mislead. A beginning in this direction has already been made by others. The most notable instance is Dr. Carl A. M. Lindman's excellent paper, "Remarks on Some American species of *Trichomanes* sect. *Didymoglossum* Desv.,"\* which may well serve as a model. Dr. Lindman's fine illustrations are drawings made by the aid of a camera lucida, not photographs, but I have preferred photography as sometimes bringing out characters the eyes may overlook.

The subject of the present paper is the identity of *Trichomanes pyxidiferum* L.

Linnaeus's description of this species reads as follows:†

"*pyxidiferum* 5. TRICHOMANES frondibus sub-bipinnatis: pinnis alternis confertis lobatis linearibus.  
 Filix pyxidifera. *Plum. fil.* 74. *t.* 50.  
 Dareae tunbrigensis facie. *Pet. fil.* 104. *t.* 13. *f.* 13.  
*Habitat in America.*"

Plumier's plant was from Santo Domingo. The locality of

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\* Ark. Bot. 1: 7-55. 1903.

† Sp. Pl. 1098. 1753.

Petiver's is not stated, except as America, but his figure points unmistakably to the same plant as Plumier's.

This species has been variously interpreted, no doubt often correctly, but probably the most common idea of it is that based on Hedwig's plate\* and description. These represent a distinct easily recognizable and common tropical American species, but a recently received specimen of quite another plant from Santo Domingo makes it appear that the latter must bear the Linnaean name. A leaf of this plant, collected on rocks near Constanza, at an altitude of 1,250 meters, March 19, 1910, by H. von Tuerckheim, No. 3069, is figured on PLATE 30, FIG. 2, together with a reproduction of a leaf from Plumier's plate, FIG. 1. It will be seen that the most notable characteristics of the two leaves, the flexuose rachis, the stiff short wide pinnae, and especially the conspicuously short broad almost inflated indusium, appear in both.

This is the plant described by Christ as *Trichomanes junceum*.† His type is from Costa Rica, collected by Wercklé, and specimens so collected, from Christ's Herbarium and now in the Underwood Herbarium at the New York Botanical Garden, agree exactly with the Von Tuerckheim plant. Two leaves from these Costa Rican plants are figured on PLATE 30, FIG. 3.

Christ cites also *Pringle 3800* from Mexico, and a leaf from this number, collected on "faces of damp rocks, Tamasopo Canyon, State of San Luis Potosi, 17 July, 1891," is figured on PLATE 30, FIG. 4, as showing a still more marked resemblance to the Plumier plate. Christ's description of his plant is reprinted below. It will be seen that his idea of *Trichomanes pyxidiferum* is of quite a different species, exactly what does not appear, but most likely the plant of Hedwig's.

"8. *Trichomanes junceum* n. spec., typ. in Herb. Christ.

"E sectione *T. pyxidiferi* L.

"Differt ab illo statura rigida valde elongata contorta, laciniis angustissimis, urceolis minimis recte patentibus sive recurvis. Habitu *Cystosirae* angustissimae comparandum, colore nigrescente.

"Rhizomate repente duro 3 mm. lato squamulis patentibus nigris dense vestito, stipite basi incrassato iisdem squamulis ves-

\* Filices Gen. et Sp. pl. 3. f. 2 and c. 1799.

† Bull. Boiss. II. 4: 944. 1904.

tito, 3 ad 4 cm. longo filiformi sed rigido, laminae rachi 10 cm. longa flexuosa, lamina lanceolata pinnis adscendentibus linearilanceolatis ad 4 cm. longis iterum pinnatis laciniis linearibus  $\frac{2}{3}$  mm. latis apice furcatis acutis nervo inconspicuo, urceolis ad basin laciniarum, brevissime pedunculatis patulis sive recurvis  $1\frac{1}{2}$  mm. longis anguste conicis vix 1 mm. latis, limbo statu maturo horizontaliter patente receptaculo exserto.

"Plante singulièrement étroite dans toutes ses parties, d'un tissu dur, bien différent du tissu diaphane de *T. pyxidiferum*.

"Hab. Costa-Rica inter muscos epiphyticum. I. Wercklé.

"Obs. Cette forme semble être assez répandue dans l'Amérique centrale. Je l'ai très bien caractérisée du Mexique. I. Pringle 3800 avec la désignation erronée: *T. radicans* Sw. Je l'ai du S. du Brésil. I. Schwacke."

As in many species of *Trichomanes*, the leaf-segments in this plant vary in width, sometimes becoming very contracted, giving the plant a still stiffer look. A curious line parallel with the margins, resembling a false vein broken at intervals, is to be seen in the dried leaves by transmitted light,\* but disappears on soaking them in water.† It seems to be formed by some contraction of the leaf-tissue. A note evidently referring to this, on the labels of some of H. H. Smith's plants, reads "the streaks parallel with the veins are a constant character," so it may be they appear also in living plants.

Additional specimens of *Trichomanes pyxidiferum* are in the Underwood Herbarium, as follows:—

CUBA: "Cuba Orientale," Wright 1807, 906 in part, 907 in part.

JAMAICA: "Old England," below Cinchona, 1070 m. alt., Underwood 1666.

MEXICO: moist virgin forest, 1524 m. alt., W. A. Murrill & Edna L. Murrill 35; without locality, Fred Müller 400, Sartorius.

PERU: near Tarapoto, R. Spruce 4761; without locality, Matthews.

COLOMBIA: rather rare on trees, damp forest, Sierra del Libano, 1524–1828 m. alt., H. H. Smith 2255; on trees and rocks, damp

\* See PLATE 30, FIG. 5. A magnifying glass showed this also in the original photograph of FIG. 3.

† See PLATE 30, FIG. 6.

forest, Sierra de Onaca, 1070-1930 m. alt., *H. H. Smith* 2443, in part.

BOLIVIA: San Juan, 1161 m. alt., *R. S. Williams* 1207.

AFRICA: Perie-Wald, Capland, 600 m. alt., *O. Kuntze*.

The question now comes up, what is Hedwig's plant? The earliest name for this that I have been able to fix upon so far with any degree of certainty is *Trichomanes hymenophylloides*, the name given by Van den Bosch in 1863 to his *T. leptophyllum*,\* which is a homonym of *T. leptophyllum* A. Cunningham. Van den Bosch's publication of his *T. leptophyllum* reads as follows: "*T. leptophyllum*. *T. pyxidiferum*. Hook. & Grev. tab. 206; Hook. sp. fil. 1, p. 121 (fide specim.)

"Hab. St. Vincent! Martinique! Guadeloupe! Jamaica! St. Domingo! Cuba!"†

Hooker and Greville's plate 206 and the long and careful accompanying description are based on specimens from St. Vincent, collected by the Rev. L. Guilding. These specimens I have not seen, but the plate and description agree well with a large series of specimens from St. Vincent and other parts of tropical America. These specimens in turn connect this plate with that of Hedwig's, which represents a less mature and more contracted leaf-state of the plant than Hooker and Greville's.

Both plates are reproduced in part on PLATE 31 of this paper, together with photographs of leaves of specimens from Santo Domingo and Jamaica.

It is scarcely necessary to reprint here Hooker & Greville's description. The essential points of it, the characteristics by which the plant differs from the plant I refer to true *T. pyxidiferum*, will be seen on PLATE 31. These are: the more slender almost delicate character of the leaf; the straighter more slender rachis; and, most conspicuously, the shape of the indusium. This, instead of being short and broad, has a long slender tube and a suddenly flaring mouth. The amount of leaf-tissue on either side of this indusium varies, even in the same leaf, as will be seen from FIG. 4. It is considerably greater in Hooker & Greville's figure than in Hedwig's, as might be expected from a figure representing, as has already been stated, a much more mature and luxuriant

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\* Ned. Kr. Arch. 5<sup>3</sup>: 209. 1863.

† Ned. Kr. Arch. 4: 363. 1859.

form of the plant. Hooker and Greville, commenting upon the indusium in relation to Plumier's plant, with which they supposed theirs to correspond, write: "A remarkable character is described by Plumier in the fructification of this plant; for the fronds, he says, are 'garnies la pluspart, dans le fond de leur découpure, d'une petite boîte, ou calice, rempli de plusieurs vesicules, et scelé par un couvercle garni d'un petit poil dans le milieu.' Now that the involucre should be closed by a convex lid, through which the columella is continued, we consider to be a circumstance impossible in the genus: but we can very well believe that, to an eye unassisted by the microscope, the large expanded and entire (not two-lipped) mouth of the involucre may have the appearance of a lid. And this dilatation of the mouth of the involucre is more remarkable than in any other species of the genus we are acquainted with. We shall be happy if other botanists concur with us in this opinion, and thus determine with tolerable satisfaction the identity of a species, which no one seems to have understood since the time of Plumier." In this connection it may be stated that in dried specimens, at least, of the plant I refer to *T. pyxidiferum*, the indusium, while not strictly two-lipped, is at first bent inward at the apex in a falsely two-lipped fashion, the two edges pressed close together except where the "columella" pushes through, so that it resembles a saccate involucre closed by a sort of convex top, although, of course, this cannot be called a "lid" in any strict sense of the word. No "streaks" or "lines," similar to those I have described in leaves of *T. pyxidiferum*, occur in *T. hymenophylloides*.

Specimens of *T. hymenophylloides* are in the Underwood Herbarium, as follows:—

PORTO RICO: Maricao, *F. L. Stevens* 1987; El Gigante, *F. L. Stevens* 1512; on tree fern, Monte Cerrote, near Adjuntas, 900–1050 m. alt., *Britton & Brown* 5426; on tree fern, between Adjuntas and Jayuya, Arroyo de los Corchos, 800–900 m. alt., *Britton, Cowell & Brown* 5267a; creeping on tree trunks in forest, Rio Prieto and adjacent hills, Sierra de Naguabo, 910 m. alt., *J. A. Shafer* 3622; on dripping wet rocks, Rio Prieto and adjacent hills, 690–1,035 m. alt., *J. A. Shafer* 3597; on rocks in mountain forest, Alto de la Bandera, near Adjuntas, *Britton & Shafer* 2070.

HISPANIOLA: Province of Barahona, Santo Domingo, *Fuertes 1511*.

CUBA: slopes and summit of El Yunque, near Baracoa, 304–608 m. alt., *Pollard & Palmer 158a* in part.

JAMAICA: Morce's Gap, 1493 m. alt., *W. Harris Fl. Jam. 7114*; trail from Vinegar Hill to Mabess River, *Underwood 1253*; Mabess River, below Vinegar Hill, 912 m. alt., *Underwood 1260* in part, *1263*; near Cuna-Cuna Pass, 820 m. alt., *Underwood 2726*; Maybess River, *George L. Fisher 43*; Morce's Gap, *George L. Fisher 110*; vicinity of Morce's Gap, 1,500 m. alt., *W. R. Maxon 2764*; without locality, *Jenman, Wilson*.

GUADELOUPE: without locality, *Madiana*; various localities, *Duss 4436* in part, *4297, 4298*.

MARTINIQUE: Bois de la Calebasse, 360–810 m. alt., *Duss 4059*; Bois du Lorrain, 350–800 m. alt., *Duss 1627*.

DOMINICA: Mt. Diablotin, *F. E. Lloyd 864*; Laudat, *F. E. Lloyd 347, 147*; Hempstead, *F. E. Lloyd 649*.

ST. KITTS: on trees in forest, Belmont, *Britton & Cowell 401*; on trees in forest, Wingfield Estate, *Britton & Cowell 452*.

MONTSERRAT: Pond Mountain, near Rocbes, 610 m. alt., *Shafer 780*; Chaner's Mountain, 610 m. alt., *Shafer 776*.

GRENADA: without locality, *Jenman*; without locality, *Sherring*; Grand Etang, St. Georges, *W. E. Broadway*.

ST. VINCENT: forest, upper Richmond and Wallibon Valleys, on trees, 456–547 m. alt., *H. H. & G. W. Smith 1724*; without locality, *H. H. & G. W. Smith 61*.

TRINIDAD: without locality, *Jenman*; without locality, *Fendler 143, 145*.

MEXICO: moist virgin forest, 1524 m. alt., *W. A. & E. L. Murrill 38*.

GUATEMALA: Pensamalá, Depart. Alta Verapaz, 1161 m. alt., *H. v. Tuerckheim 949*.

COLOMBIA: damp forest, especially glens, near streams, common on trees, logs and rocks, Las Partidas, 1070 m. alt., *H. H. Smith 2256*; on rocks by stream, damp forest, Sierra del Libano, 1828 m. alt., *H. H. Smith 2442*; damp forest, common on trees, Sierra de Onaca, 760–1980 m. alt., *H. H. Smith 2443* in part.

ECUADOR: Andes, *R. Spruce 5355*.



**Description of plates 30 and 31**

## PLATE 30

## TRICHOMANES PYXIDIFERUM L.

FIG. 1. Reproduction of part of *pl. 50*, Plumier's *Traité des fougères de l'Amérique*. Paris. 1705.

FIG. 2. Leaf from Santo Domingo, *H. v. Tuerckheim 3069*, natural size.

FIG. 3. Leaf from Costa Rica, *Wercklé*, natural size, authentic specimen of *T. junceum* Christ from Christ's herbarium.

FIG. 4. Leaf from Mexico, *Pringle 3800*, natural size, referred by Christ to *T. junceum*.

FIG. 5. Part of a dried sterile leaf from specimen shown in FIG. 2, enlarged.

FIG. 6. Part of a fertile leaf from specimen shown in FIG. 2, after soaking in water, enlarged.

## PLATE 31

## TRICHOMANES HYMENOPHYLLOIDES Van den Bosch

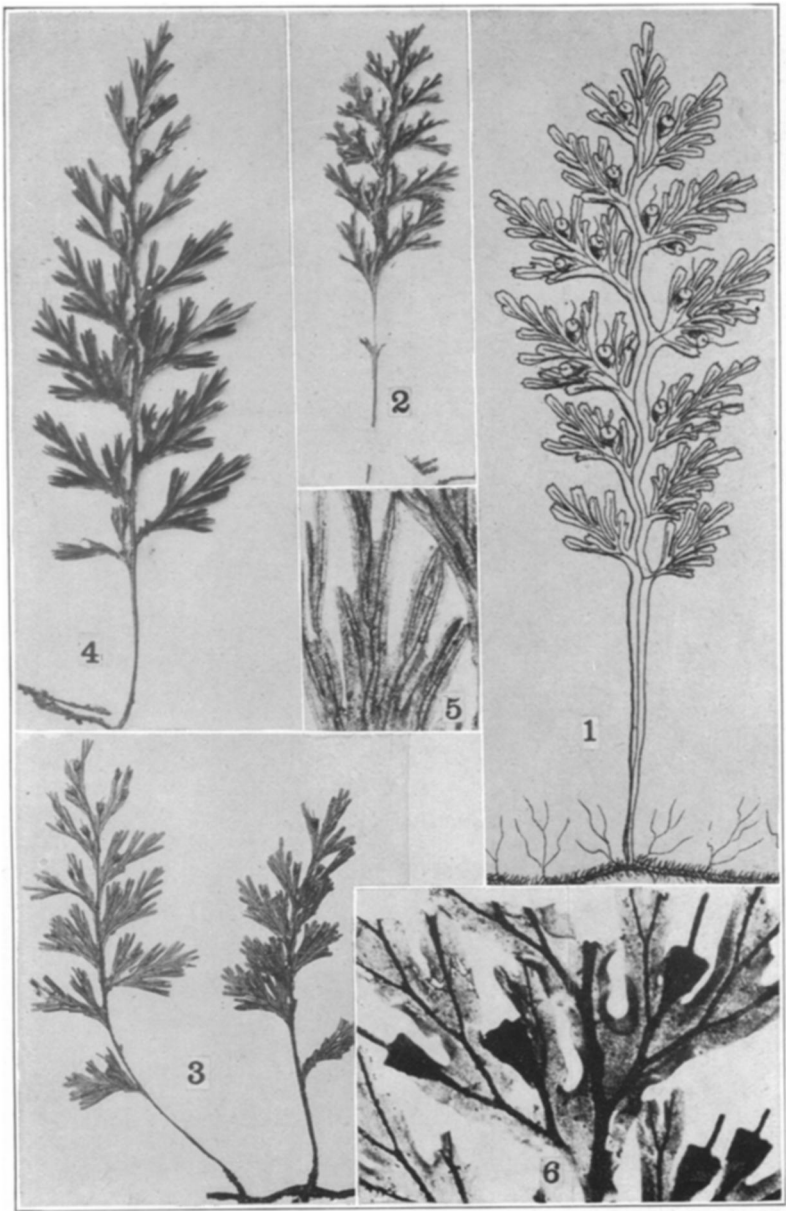
FIGS. 1, 3, 4. Reproduction of part of *pl. 206*, Hooker & Greville's *Icones filicum*. London. 1831. FIGS. 1, 3. Fertile leaves. FIG. 4. Portion of a fertile leaf, enlarged.

FIGS. 2 and *c*. Reproduction of part of *pl. 3*, Hedwig's *Filicum genera et species*. Leipzig. 1799.

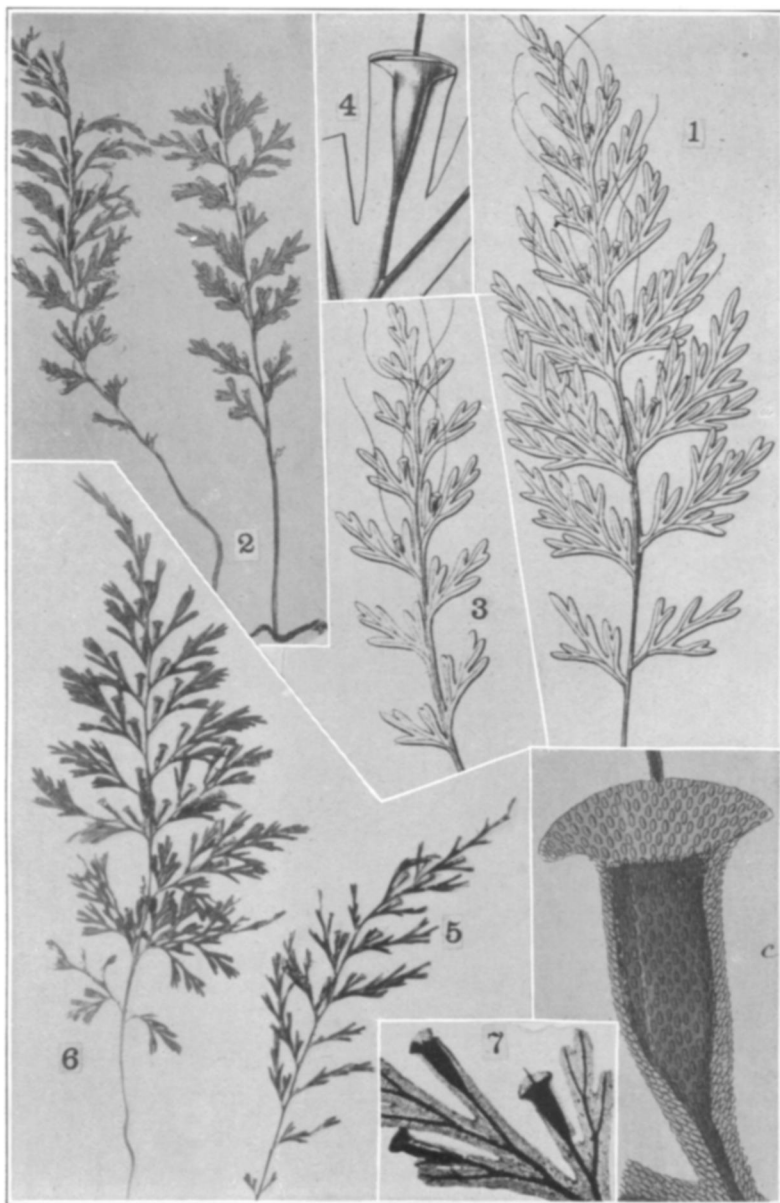
FIG. 5. Leaf from Santo Domingo, *Fuertes 1511*, natural size.

FIG. 6. Leaf from Jamaica, *Underwood 1260*, natural size.

FIG. 7. Part of a fertile leaf from specimen shown in FIG. 5, enlarged.



TRICHOMANES PYXIDIFERUM L.



TRICHOMANES HYMENOPHYLLOIDES VAN DEN BOSCH